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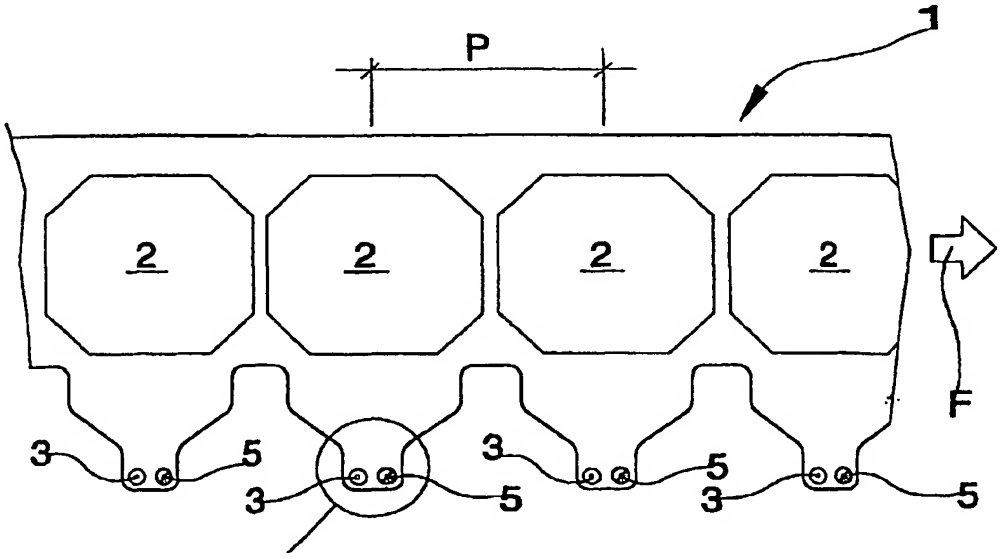
(54) Title: CONTINUOUS STRIP OF CONTAINERS



(57) Abstract: In a continuous strip (1) of containers (2), the latter are distributed stepwise from one another according to a longitudinal axis of the strip. From one longitudinal edge zone traction pins (3) protrude laterally that are intended in use to interact by contact with an advancing device for advancing the strip. For each traction pin (3) a corresponding opposing projection (5) is prearranged that protrudes from the opposite side of the longitudinal edge zone. The strip is designed to be conveyed along an advancing direction (F) that is parallel to a longitudinal axis thereof. Each opposing projection is located slightly forward in relation to said advancing direction, compared with the relative traction pin (3), at an axial distance that is shorter than the step (P) between the containers.

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SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)*

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for the following designation US*

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Continuous strip of containers

The present invention concerns a continuous strip of containers.

Specifically, but not exclusively, this invention can be used in a machine for forming, filling, sealing and cooling containers arranged in a continuous strip in heat-sealable and thermoformable plastic material.

In prior-art machines of this type the strip of containers is conveyed by an advancing device operating with a thrust action, comprising a running guide defined by two guide walls that contain a longitudinal edge zone of the strip. The device furthermore comprises one or more flexible dragging members arranged in a closed ring and each member provided with one or more thrust protrusions. The latter are provided to interact by contact with traction pins that are pre-formed on the strip, which pins protrude laterally from a side of the edge zone of the strip contained in the running guide. From the opposite side opposing projections protrude laterally which oppose to strip flexure due to the thrust action of the thrust protrusions carried by the flexible dragging member.

Normally, this thrust-action advancing device is used to convey the strip of containers, that has already been filled and sealed, inside a refrigerator to cool the filling material.

One of the disadvantages of a thrust-action advancing device of the aforementioned type is the fact that it can ensure the strip advancing only if the strip has relatively high flexure stiffness; otherwise, the thrust protrusion that acts on the traction pin causes the strip to bend laterally to such an extent as the same thrust protrusion even loses its engagement on the pin, thereby making the device ineffective.

The main object of the present invention is to provide a strip of containers, appliable to a thrust-action advancing device, by means of which said problem can be solved.

An advantage of the invention is that it is possible to make a

simple and cheap strip of containers.

Another advantage is that a strip of containers is made available, which ensures a high reliability of the thrust-action advancing device in which the strip is used.

These objects and advantages and yet others are achieved by this invention, as it is characterized by the claims set out below.

Further features and advantages of the present invention will be better disclosed in the following detailed description of an embodiment thereof, shown in the exemplifying and not limiting accompanying drawings.

Figure 1 is a side view of a section of a strip of containers according to this invention.

Figure 1A is a left side view of the enlarged detail of figure 1.

Figure 2 is a plan view from above of an advancing device applied to the strip in figure 1.

Figure 3 is a section taken along the axis III-III of figure 2.

In the abovementioned figures, 1 indicates a continuous strip of containers 2 in which the strip has a preset width and an undefined length and in which the containers 2 are arranged in sequence, at a constant step P, one after the other, according to a longitudinal axis of the strip. The containers, in the case in point, are full and sealed. The strip can be made, for example, by a machine for forming, filling and sealing at least one strip of containers starting with one or more continuous webs unwound by reels and made into film of heat-sealable and thermoformable plastic material.

The strip 1 of containers has a longitudinal edge zone from which traction pins 3 protrude laterally that in use interact by contact with an advancing device 4 for advancing the strip. The prior-art device is shown in figures 2 and 3. The strip is designed to be conveyed according to an advancing direction F that is parallel to its longitudinal axis.

The strip 1 comprises, for each traction pin 3, a corresponding opposing projection 5 that protrudes from the opposite side of the longitudinal edge zone. In the case in point disclosed here, the traction pins 3 protrude to the left (with reference to the advancing direction F), while the opposing projections protrude to the right.

Each opposing projection 5 is located further forward, in relation to the advancing direction F, compared with the relative traction pin 3 at an axial distance shorter than the step P between the containers. It is preferable that the axial distance between the opposing projection 5, located further forward, and the relative traction pin 3, located further back, is significantly shorter than the step P between the containers: in particular it is shorter than at least half of the step P. The opposing projections 5 and the traction pins 3 are preferably made by thermoforming; they are substantially formed by deforming the film material with which the containers are formed and along the same forming line as the containers.

The number and the distribution of the traction pins is such that a traction pin 3 and a corresponding opposing projection 5 are associated with each container 2. Both the traction pins 3 and the opposing projections 5 are distributed with a step that is equal to the step P between the containers.

The edge of the longitudinal edge zone, i.e. the strip edge near which there are the traction pins and the opposing projections, is configured in a sinuous manner in such a way that the longitudinal edge zone alternates, with a step that is equal to the step P between the containers, a full zone, i.e. a zone occupied by the material of the strip 1, and an empty zone, i.e. a zone free of the material of the strip, as shown in this case in figure 1. Each traction pin 3, and each relative opposing projection 5, are both situated on the same full zone of the edge zone. Each full zone has a traction pin 3 and the relative opposing projection 5.

The longitudinal edge zone, in which the traction pins 3 and the opposing projections 5 are prearranged, is a flat and thin zone without the swollen and containing parts (in which the filling material is held) of the containers.

The strip of containers is in particular, but not only, used within the advancing device 4. The latter comprises an advancing guide 6 for advancing the strip forward and at least one flexible dragging member 8, which in the case in point is of the chain type.

The guide 6 extends along an advancing direction that is parallel to the longitudinal axis of the strip. In the case in point, in which the advancing direction F of the strip is horizontal, also the guide 6 extends in a horizontal direction. The advancing guide 6 is defined laterally by two running surfaces 7 that are parallel to one another and are provided to contain the longitudinal edge zone of the strip 1, i.e. the zone provided with the traction pins 3 and the opposing projections 5. The running surfaces 7 are preferably flat and vertical.

The flexible dragging member 8, which is prearranged for conveying forwards the strip 1 of containers, is looped in a closed ring. The active branch of the flexible dragging member is the top horizontal branch, which is located underneath the route of the strip 1 and on which the strip preferably rests. If the advancing route of the strip 1 is particularly long, a sequence of flexible members can be used that are arranged one after the other at a preset distance from one another so as to ensure the strip dragging along the entire route. Each flexible dragging member is movable in a direction that is parallel to the preset advancing direction F of the strip and has one or several thrust elements 9 prearranged to interact by contact with the traction pins 3. The thrust elements 9 are distributed along the dragging member, preferably at a constant step, in such a way that at least one of them is always engaged with a

traction pin 3 of the strip.

In the case in point, in which the advancing direction F of the strip is horizontal, the thrust elements 9 protrude vertically from the flexible dragging member 8, whilst the traction pins 3 and the opposing projections 5 protrude horizontally. When a thrust element 9 comes into contact with a traction pin 3, the opposing projection 5 associated with that pin interacts by contact with the running surface 7 facing the projection, so as to oppose the (horizontal) flexure of the strip 1 of containers due to the action of the thrust element 9. In order for the opposing action to be effective, preferably each opposing projection 5 is placed slightly forward in relation to the advancing direction F, compared with the relative traction pin 3, at a short distance from the pin. Said distance is preferably shorter than twice the width of the advancing guide 8. In the case in point said distance is slightly shorter than the sum obtained adding the height of the traction pin 3 to the height of the opposing projection 5.

The width of the advancing seat 8, i.e. the horizontal distance between the two running surfaces 7, is substantially equal to or slightly greater than the horizontal distance, considered in a direction that is perpendicular to the advancing direction F, between the lateral ends (right and left) of a traction pin 3 and of the relative opposing projection 5.

The advancing device 4 can be applied in particular to convey the strip of containers along a tortuous and relatively very long route, within a cooling zone in which the filling material of the containers is cooled. The tortuous route of the strip inside the cooled environment of the refrigerator may, for example, comprise a long spirally shaped section.

The part of the strip that comprises the traction pins 3 and the opposing projections 5 can be intended to be subsequently eliminated by blanking in a terminal part of the strip route when said elements are no longer necessary for conveying the

strip.

For each container, the prearrangement of a traction pin and of a opposing projection (the opposing projection being situated just after the traction pin on the opposite side of the strip) ensures efficient thrust interaction between the advancing device and the traction pin: in particular, the opposing projection 5 prevents the longitudinal edge zone of the strip to be subjected to horizontal flexure enough to disengage the traction pin 3 pushed by the thrust element 9.

Many different practical applicational modifications of constructional details may be applied to the invention without thereby leaving the scope of the inventive idea that is claimed below.

CLAIMS

1. Continuous strip (1) of containers (2) wherein:
the containers (2) are distributed stepwise one after another according to a longitudinal axis of the strip;
the strip (1) of containers has at least one longitudinal edge zone from which traction pins (3) protrude laterally said pins being intended in use to interact by contact with an advancing device (4) for advancing the strip;
the strip (1) comprises, for each traction pin (3), at least one corresponding opposing projection (5) that protrudes from the opposite side of the longitudinal edge zone.

2. Strip according to claim I, characterised in that it is intended to be conveyed along an advancing direction (F) parallel to a longitudinal axis of said strip and in that each opposing projection (5) is located further forward, in relation to said advancing direction (F), compared with the relative traction pin (3), at an axial distance that is shorter than the step (P) between the containers.

3. Strip according to claim 2, characterised in that the axial distance between the opposing projection (5), located further forward, and the relative traction pin (3), located further back, is shorter than half the step (P) between the containers.

4. Strip according to any one of the previous claims, characterised in that the strip (1) comprises, for each container (2), at least one traction pin (3) and at least one corresponding opposing projection (5).

5. Strip according to any one of the previous claims, characterised in that both the traction pins (3) and the opposing projections (5), are distributed with a step that is equal to the step (P) between the containers.

6. Strip according to any one of the previous claims, characterised in that the edge of the strip is configured

in a sinuous manner in such a way that the longitudinal edge zone alternates, with a step that is equal to the step (P) between the containers, a full zone occupied by the material of the strip (1) and an empty zone that is free of the material of the strip.

7. Strip according to claim 6, characterised in that each traction pin (3), and each relative opposing projection (5) are both situated in the same full zone.

8. Strip according to claim 6 or 7, characterised in that each full zone has a traction pin (3) and the relative opposing projection (5).

9. Use of the strip of containers according to any one of the previous claims, in the context of an advancing device (4) of the strip, according to which: the advancing device (4) comprises:

an advancing guide (6) for advancing the strip, which guide (6) extends in length according to an advancing direction (F) that is parallel to the longitudinal axis of the strip, said advancing guide (6) being defined laterally by two running surfaces (7) that are parallel to each other and are provided to contain the longitudinal edge zone of the strip (1);

at least one dragging member (8) prearranged to push the strip (1) of the containers forward, which member is movable in a direction parallel to the advancing direction (F) and has one or more thrust elements (9) prearranged to interact by contact with the traction pins (3);

during operation, when a traction pin (3) comes into contact with a thrust element (9), the opposing projection (5) associated with the pin (3) interacts by contact with the running surface (7) facing the projection to oppose the flexure of the strip (1) of containers that is due to the action of the thrust element (9).

10. Use according to claim 9, characterised in that each

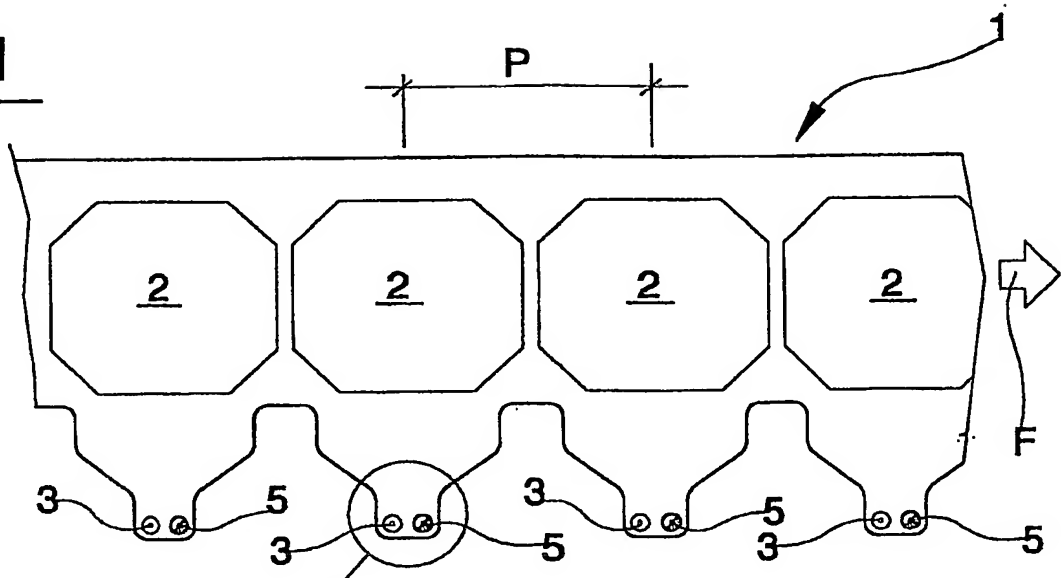
opposing projection (5) is located slightly forward, in relation to the advancing direction (F), compared with the relative traction pin (3), at a distance that is not shorter than the width of the advancing guide (8).

11. Use according to claim 9 or 10, characterised in that the width of the advancing seat (8), i.e. the distance between the two running surfaces (7), is substantially equal or slightly greater than the distance, considered in a direction that is perpendicular to the advancing direction (F), between the side ends of a traction pin (3) and of the relative opposing projection (5).

12. Strip of containers according to the previous claims and according to the descriptions and illustrations with reference to the figures of the enclosed drawings and for the purposes stated above.

13. Use of the strip of containers according to the previous claims and according to the descriptions and illustrations with reference to the figures of the enclosed drawings and for the purposes stated above.

Fig. 1



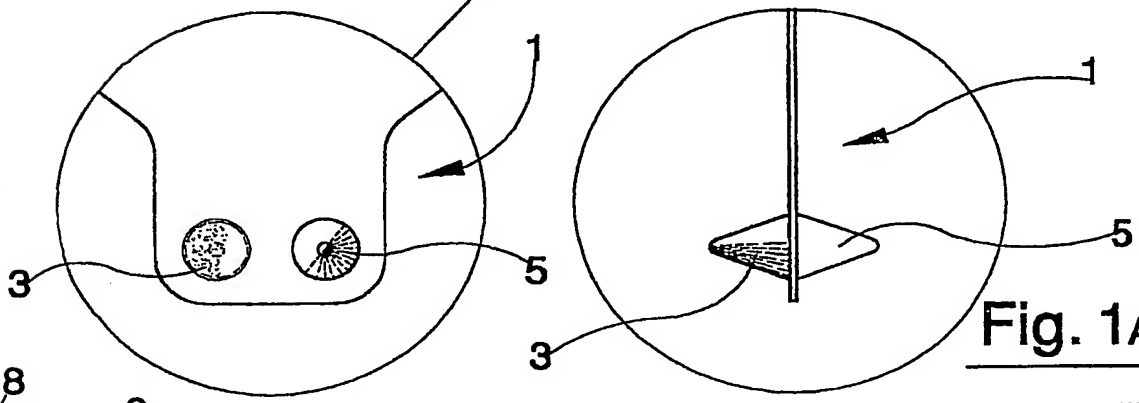


Fig. 1A

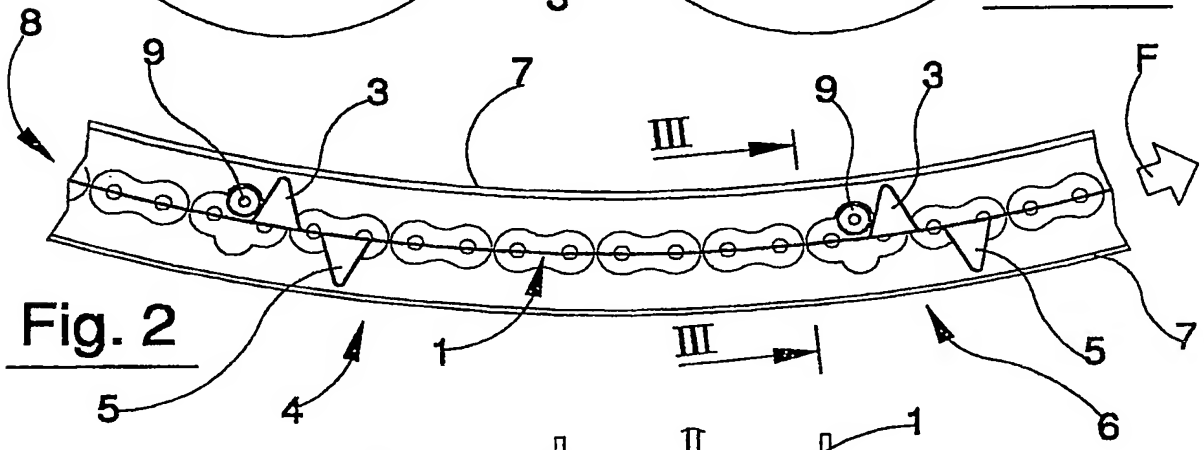


Fig. 2

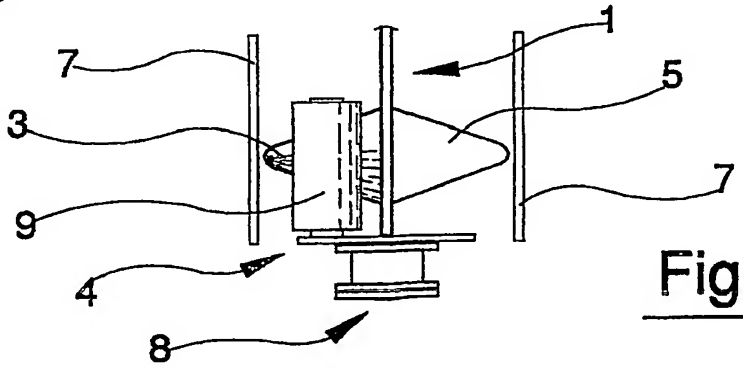


Fig. 3

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B65D75/42 B65B9/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B65D B65B B29C B65G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 12 27 638 B (BEBO PLASTIK G M B H) 27 October 1966 (1966-10-27) figures ---	1,9
A	US 5 729 963 A (BIRD GERALD C) 24 March 1998 (1998-03-24) figures ---	1,9
A	US 4 897 074 A (KNIGHT RICHARD K) 30 January 1990 (1990-01-30) figures --- -/--	1,9

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

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Date of the actual completion of the international search	Date of mailing of the international search report
30 May 2003	11/06/2003

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Kosicki, T

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 10 84 558 B (WILH SCHMITZ SCHOLL FA) 30 June 1960 (1960-06-30) The applicant should be informed that his own cited Prior Art Document in the description is novelty destroying for claims 1-5 9-11 figures	1,9

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

patent family members

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US 4897074	A	30-01-1990	NONE		
DE 1084558	B	30-06-1960	NONE		